

## AMENDMENTS TO THE CLAIMS

Please enter amendments to the claims to cancel Claims 1-12 and 159-166, without prejudice to or disclaimer of any subject matter, and to add new Claims 167-232. A complete listing of the claims follows beginning on the next page.

COMPLETE LISTING OF CLAIMS

Claims 1-166 (Cancelled)

167. (New) An automated method for making particles, the method comprising:  
processing of a batch of precursor liquid, comprising a liquid vehicle and a precursor material, to manufacture a batch of particulate product, the processing including batch initiation operations, batch termination operations and intermediate operations, the intermediate operations occurring between the batch initiation operations and the batch termination operations;  
the intermediate operations comprising:  
a) generating an aerosol stream from an aerosol generator, as generated the aerosol stream comprising droplets of the precursor liquid dispersed in a carrier gas, with the droplets being at a weight average size of from 1 micron to 10 microns; and  
b) forming the particles, the forming comprising heating the aerosol stream in an aerosol heater;  
prior to commencement of the batch initiation operations and after completion of the batch termination operations, the aerosol stream not being generated;  
the batch initiation operations comprising commencing generation of the aerosol stream and the batch termination operations comprising ceasing generation of the aerosol stream; and  
at least one operation during the batch initiation operations, the intermediate operations and the batch termination operations being automatically controlled at the direction of an electronic processor processing instructions for manufacture of the particles of the selected composition.

168. (New) The method of Claim 167, wherein an operation during the batch initiation operations is automatically controlled at the direction of the electronic processor.

169. (New) The method of Claim 168, wherein the batch initiation operations comprise automatically commencing, at the direction of the electronic processor, supply of the precursor liquid to aerosol generator.

170. (New) The method of Claim 169, wherein the aerosol generator is an ultrasonic aerosol generator.

171. (New) The method of Claim 169, wherein the aerosol generator is a spray nozzle atomizer.

172. (New) The method of Claim 168, wherein the batch initiation operations comprise automatically commencing, at the direction of the electronic processor, supply of the carrier gas to the aerosol generator.

173. (New) The method of Claim 168, wherein the batch initiation operations comprise automatically commencing, at the direction of the electronic processor, supply of the precursor liquid and supply of the carrier gas to the aerosol generator.

174. (New) The method of Claim 168, wherein the batch initiation operations comprise automatically increasing, at the direction of the electronic processor, temperature within the aerosol heater.

175. (New) The method of Claim 174, wherein the heater comprises at least two end caps, a first end cap adjacent a flow entrance into the heater and a second end cap adjacent a flow exit from the heater, the step of increasing the temperature within the aerosol heater comprising cooling, at the direction of the electronic processor, at least one of the first and second end caps.

176. (New) The method of Claim 174, wherein the heater comprises a furnace having a plurality of heating zones and, during the step of increasing the temperature, heat input

into each of the heating zones being automatically independently controlled at the direction of the electronic processor.

177. (New) The method of Claim 174, wherein the aerosol heater is a flame reactor.

178. (New) The method of Claim 174, wherein the aerosol heater is a plasma reactor.

179. (New) The method of Claim 168, wherein the intermediate operations comprise cooling in an aerosol cooler the particles after the forming particles, the cooling comprising introducing a cooling gas into the aerosol stream in the aerosol cooler; and  
the batch initiation operations comprise automatically commencing, at the direction of the electronic processor, supply of the cooling gas to the aerosol cooler.

180. (New) The method of Claim 168, wherein the batch initiation operations comprise automatically pressure testing, at the direction of the electronic processor, a flow path of the aerosol stream for leaks prior to commencing the generating the aerosol stream.

181. (New) The method of Claim 168, wherein the intermediate operations comprise cooling in an aerosol cooler the particles after the forming particles, the cooling comprising introducing a cooling gas into the aerosol stream in the aerosol cooler;  
the intermediate operations further comprising, after the cooling, collecting the particles in a particle collector; and  
the batch initiation operations comprise automatically conditioning, at the direction of the electronic processor, the aerosol heater, the aerosol cooler and the particle collector;  
the conditioning comprising, prior to commencement of the generating the aerosol stream, raising the temperature within each of the aerosol heater, aerosol cooler and particle collector.

182. (New) The method of Claim 167, wherein an operation during the intermediate operations is automatically controlled at the direction of the electronic processor.

183. (New) The method of Claim 182, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the carrier gas to the aerosol generator during the generating the aerosol stream.

184. (New) The method of Claim 182, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the liquid precursor to aerosol generator during the generating the aerosol stream.

185 (New) The method of Claim 182, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the liquid precursor and feed rate of the carrier gas to the aerosol generator during the generating the aerosol stream.

186. (New) The method of Claim 185, wherein the aerosol generator is an ultrasonic aerosol generator.

187. (New) The method of Claim 185, wherein the aerosol generator is a spray nozzle atomizer.

188. (New) The method of Claim 182, wherein the intermediate operations comprise cooling in an aerosol cooler the particles after the forming particles, the cooling comprising introducing a cooling gas into the aerosol stream in the aerosol cooler; and  
the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the cooling gas to the aerosol cooler.

189. (New) The method of Claim 188, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the carrier gas to the aerosol generator during the generating the aerosol stream.

190. (New) The method of Claim 189, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, feed rate of the liquid precursor to aerosol generator during the generating the aerosol stream.

191. (New) The method of Claim 182, wherein the intermediate operations comprise automatically controlling, at the direction of the electronic processor, heat input into the aerosol heater.

192. (New) The method of Claim 191, wherein the heater comprises a furnace having a plurality of heating zones and, during the intermediate operations heat input into each of the heating zones being automatically independently controlled at the direction of the electronic processor.

193. (New) The method of Claim 191, wherein the aerosol heater is a flame reactor.

194. (New) The method of Claim 191, wherein the aerosol heater is a plasma reactor.

195. (New) The method of Claim 167, comprising automatically interrupting, at the direction of the electronic processor, of the generating the aerosol stream during the intermediate operations.

196. (New) The method of Claim 195, wherein the interrupting comprises automatically ceasing supply of the liquid precursor to the aerosol generator.

197. (New) The method of Claim 196, comprising after the interrupting, recommencing the generating the aerosol stream during the intermediate operations, the recommencing comprising commencing supply of the liquid precursor to the aerosol generator.

198. (New) The method of Claim 196, wherein the interrupting comprises ceasing supply of the carrier gas to the aerosol generator.

199. (New) The method of Claim 198, wherein the interrupting comprises ceasing heat input in the aerosol heater.

200. (New) The method of Claim 195, comprising after the interrupting, automatically recommencing, at the direction of the electronic processor, the generating the aerosol stream during the intermediate operations.

201. (New) The method of Claim 167, wherein an operation during the batch termination operations is automatically controlled at the direction of the electronic processor.

202. (New) The method of Claim 201, wherein the batch termination operations comprise automatically terminating, at the direction of the electronic processor, supply of the precursor liquid to aerosol generator.

203. (New) The method of Claim 202, wherein the aerosol generator is an ultrasonic aerosol generator.

204. (New) The method of Claim 202, wherein the aerosol generator is a spray nozzle atomizer.

205. (New) The method of Claim 201, wherein the batch termination operations comprise automatically terminating, at the direction of the electronic processor, supply of the carrier gas to the aerosol generator.

206. (New) The method of Claim 201, wherein the batch termination operations comprise automatically terminating, at the direction of the electronic processor, supply of the precursor liquid and supply of the carrier gas to the aerosol generator.

207. (New) The method of Claim 201, wherein the batch termination operations comprise automatically decreasing, at the direction of the electronic processor, temperature within the aerosol heater.
208. (New) The method of Claim 207, wherein the heater comprises a furnace having a plurality of heating zones and, during the step of decreasing the temperature, heat input into each of the heating zones being automatically independently controlled at the direction of the electronic processor.
209. (New) The method of Claim 207, wherein the aerosol heater is a flame reactor.
210. (New) The method of Claim 207, wherein the aerosol heater is a plasma reactor.
211. (New) The method of Claim 201, wherein the intermediate operations comprise cooling in an aerosol cooler the particles after the forming particles, the cooling comprising introducing a cooling gas into the aerosol stream in the aerosol cooler; and  
the batch termination operations comprise automatically terminating, at the direction of the electronic processor, supply of the cooling gas to the aerosol cooler.
212. (New) The method of Claim 201, wherein the intermediate operations comprise cooling in an aerosol cooler the particles after the forming particles, the cooling comprising introducing a cooling gas into the aerosol stream in the aerosol cooler;  
the intermediate operations further comprising, after the cooling, collecting the particles in a particle collector; and  
the batch termination operations comprise automatically purging, at the direction of the electronic processor, an aerosol flow path comprising the aerosol heater, the aerosol cooler and the particle collector.
213. (New) The method of Claim 167, wherein the aerosol stream as generated comprises a loading of greater than  $1 \times 10^6$  droplets per cubic centimeter.



214. (New) The method of Claim 167, wherein the aerosol stream as generated comprises a volumetric ratio of liquid feed to carrier gas that is larger than 0.04 milliliters of liquid feed per liter of carrier gas.

215. (New) The method of Claim 167, wherein the weight average particle size of the particles is from 0.05 micron to 4 microns.

216. (New) The method of Claim 167, wherein the weight average size of the droplets is from 1 micron to 5 microns.

217. (New) The method of Claim 167,  
wherein the generating an aerosol stream comprises use of an ultrasonic aerosol generator including a plurality of activated ultrasonic transducers; and  
wherein the intermediate operations comprise:  
supplying the carrier gas to the ultrasonic aerosol generator from a carrier gas supply system in fluid communication with the ultrasonic aerosol generator;  
supplying a precursor liquid feed from a precursor liquid supply system in fluid communication with the ultrasonic aerosol generator;  
the intermediate operations comprising automatically controlling, at the direction of the electronic processor, feed rate of the carrier gas and feed rate of the liquid precursor to the aerosol generator.

218. (New) An automated method for operating an aerosol process to make particles, the method comprising:  
generating an aerosol stream, as generated the aerosol stream comprising droplets of the precursor liquid dispersed in a carrier gas, with the droplets having a weight average size of from 1 micron to 10 microns; and  
forming the particles, the forming comprising heating the aerosol stream in an aerosol heater;

wherein the generating the aerosol stream is automatically interruptible at the direction of an electronic processor processing instructions for manufacture of the particles.

219. (New) The method of Claim 218, wherein when the generating the aerosol stream is automatically interrupted at the direction of the electronic processor, supply of the liquid precursor to the aerosol generator at the direction of the electronic processor.

220. (New) The method of Claim 218, wherein when the generating the aerosol stream is automatically interrupted at the direction of the electronic processor, supply of the carrier gas to the aerosol generator at the direction of the electronic processor.

221. (New) The method of Claim 218, wherein when the generating the aerosol stream is automatically interrupted at the direction of the electronic processor, heat input in the aerosol heater at the direction of the electronic processor.

222. (New) The method of Claim 218, wherein the generating the aerosol stream is automatically recommencible at the direction of the electronic processor after interruption of the generating the aerosol stream.

223. (New) An automated method for operating an aerosol process to make particles, the method comprising:

generating an aerosol stream, as generated the aerosol stream comprising droplets of the precursor liquid dispersed in a carrier gas, with the droplets having a weight average size of from 1 micron to 10 microns; and

forming the particles, the forming comprising heating the aerosol stream;

wherein one or both of feed of the liquid precursor to the generating and feed of carrier gas to the generating is automatically controlled at the direction of an electronic processor processing instructions for manufacture of the particles.

224. (New) The method of Claim 223, comprising:

cooling the particles after the forming particles; and  
automatically controlling, at the direction of the electronic processor, feed rate of the cooling gas to the cooling.

225. (New) The method of Claim 223, wherein both the feed of the liquid precursor to the generating and the feed of the carrier gas to the generating are automatically controlled at the direction of the electronic processor.

226. (New) The method of Claim 223, wherein during the generating, the aerosol is generated from an ultrasonic aerosol generator.

227. (New) The method of Claim 223, wherein during the generating, the aerosol generated from a spray nozzle atomizer.

228. (New) The method of Claim 223, comprising automatically controlling, at the direction of the electronic processor, heat input to aerosol stream during the heating.

229. (New) The method of Claim 223, wherein the heating is performed in a furnace having a plurality of heating zones and, during the intermediate operations heat input into each of the heating zones is automatically independently controlled at the direction of the electronic processor.

230. (New) The method of Claim 223, wherein the heating is performed in a flame reactor.

231. (New) The method of Claim 223, wherein the heating is performed in a plasma reactor.

232. (New) The method of Claim 223, wherein the generating the aerosol stream is automatically interruptible at the direction of the electronic processor.